

Abstract of the Disclosure

The objective of the present invention is to provide a method for approximating and displaying a three-dimensional object represented by CAD data. In particular, the present invention provides a method for approximating CAD data representing a three-dimensional object, comprising steps of: (a) generating a mesh with mesh lines for approximating each face of the three-dimensional object represented by the CAD data within a rough conversion tolerance with respect to a specified conversion tolerance; (b) approximating a boundary edge surrounding and defining each individual face with a plurality of curves within the specified conversion tolerance, approximating each of the curves with a polyline comprising points and connecting lines within the rough conversion tolerance to define boundary points which are the points of the polylines; and obtaining a vector tangential to the curve at each of the boundary points; (c) generating polygons with three or four vertices by connecting internal points which are points of intersection of the mesh lines inside the boundary edge, and by connecting the boundary points and the internal points that are adjacent to and inside the boundary edge; (d) calculating a vector normal to the face at each of the vertices of each of the polygons, storing information identifying the vertices and the corresponding normal vectors, and storing the tangential vector at each of the boundary points obtained at the step (b); (e) converting each of the polygons with three or four vertices to a triangular or quadrilateral surface by using a plurality of control points obtained by processing the information identifying the vertices, the normal vectors, and the tangential vectors; and (f) examining if each of the triangular or quadrilateral surfaces is close to the face represented by the CAD data within the specified conversion tolerance, and if not, regenerating a mesh with a narrower mesh width and more mesh lines on the face to repeat the steps (c) - (e) and (f). It is preferable that the polygons are triangles.